

Appln No. 10/037,897
Amdt date October 24, 2005
Reply to Office action of August 24, 2005

REMARKS/ARGUMENTS

The above identified patent application has been amended and reconsideration is hereby requested. Claims 1-7, 10-15 and 17-34 are pending in the application, of which claims 1, 7, 15, 26 and 30 are independent. Claims 10, 17, 19 and 28 have been amended herein. No claims have been cancelled or added by this amendment. Applicant respectfully requests reconsideration and allowance of claims 1-7, 10-15 and 17-34.

I. Examiner Interview

Applicant wishes to thank Examiner Jamal for the time and courtesy extended to Applicant's attorney during the interview of October 19, 2005 in which the Chang reference and the background section of Applicant's specification were discussed with regard to the independent claims. While this discussion was helpful, no agreement was reached with regard to the allowance or allowability of any claims.

II. The Rejection of Claims 1-7, 10-15, and 17-34 under 35 U.S.C. § 103(a)

The Examiner has rejected Claims 1-7, 10-15, and 17-34 under 35 U.S.C. §103(a) as allegedly being obvious over Applicant's allegedly admitted prior art, namely the background section of the specification ("background"), in further view of the reference of Chang et al. ("Chang").

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (MPEP §2142).

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A. The Prima Facie Case of Obviousness under §103(a) Has Not Been Established for Claims 1-7, and 10-14

1. Combination Does Not Teach all Claim Limitations

Examiner has not demonstrated that the combination of references teaches or suggests all the claim limitations. (MPEP §2143). While the allegedly admitted prior art in the Background of the Invention section of the instant application discloses a need for reducing the undesirable effects of intermodulation that occur when operating a single-die transceiver, it does not disclose varying the output frequency of one voltage-controlled oscillator until the output frequency of another voltage-controlled oscillator falls out of lock.

Even with the combination of Chang and the allegedly admitted prior art, where one skilled in the art were to replace one or both VCOs of the transceiver in the background section of the instant application with the VCO of Chang, this would still not teach "varying the output frequency of the first voltage-controlled oscillator until the output frequency of the second voltage-controlled oscillator falls out of lock." (Claim 1, underlining added). In contrast, what would probably be produced would be a transceiver with two independently locking VCOs having the features described in Chang. These VCOs probably would have been calibrated independently rather than in combination, because there is no teaching or suggestion of "varying the output frequency of the first voltage-controlled oscillator until the output frequency of the second voltage-controlled oscillator falls out of lock" in Chang or the allegedly admitted prior art.

Therefore, because the cited references either alone or in combination do not disclose "varying the output frequency of the first voltage-controlled oscillator until the output frequency of the second voltage-controlled oscillator falls out of lock with the output frequency of the first voltage-controller oscillator" among other limitations as recited in Claim 1 or "varying the output frequency of the voltage-controlled oscillator until the output frequency of the voltage-controlled oscillator falls out of lock with the other voltage-controlled oscillator" among other limitations as recited in Claim 7, the proposed combination in no way teaches or suggests all the limitations of claim 1 or claim 7.

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2. *No Motivation to Combine References*

Examiner has not demonstrated any suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. (MPEP §2143).

Examiner states that "it would have been obvious to one of ordinary skill in the art at the time of this application that the crosstalk problem disclosed by applicant's background section could be solved by implementing Chang's teachings..." Applicant respectfully traverses this argument. Chang does not disclose more than one VCO. Further, nothing in Chang discloses varying the output frequency of a first VCO to intentionally affect the performance of a second VCO, as recited in Claim 1 and similarly in Claim 7. Indeed, Chang focuses on the conditions under which a single VCO will lock to a signal. Chang is silent as to the performance of a plurality of VCOs in proximity to one another. Thus, Chang does not suggest the proposed modification. While the alleged admitted prior art, specifically Applicant's background section, pages 2-3 of the specification, does envision a pair of VCOs, it is only in so far as it describes the problems present in the prior art with known arrangements, such as the exemplary integrated transceiver described at line 23 of page 1, it does not suggest a combination with the method of Chang. Further, Examiner has failed to disclose any reference which is available to one of ordinary skill in the art that suggests making the proposed combination. Thus, Examiner has not demonstrated any suggestion or motivation to combine in Chang, Applicant's background section, or the knowledge of one skilled in the art.

Since the proposed combination of the alleged applicant admitted prior art and Chang does not teach or suggest all the claim limitations, and because Examiner did not demonstrate any suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, the Examiner failed to establish a *prima facie* case of obviousness for claims 1 and 7. Therefore, claims 1 and 7 would not have been obvious at the time of the invention in view of the alleged applicant admitted prior art and Chang. Therefore, Applicant respectfully requests that the rejection of claims 1 and 7 be withdrawn and that they be allowed.

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Claims 2-6 depend, directly or indirectly, from Claim 1. As such, Claims 2-6 each incorporate all the terms and limitations of claim 1 in addition to other limitations, which together further patentably distinguish them over the cited references. Therefore, Applicant requests that the rejection of Claims 2-6 be withdrawn and that they be allowed. Claims 10-14 depend, directly or indirectly, from claim 7. As such, Claims 10-14 each incorporate all the terms and limitations of claim 7 in addition to other limitations, which together further patentably distinguish them over the cited references. Therefore, Applicant requests that the rejection of Claims 10-14 be withdrawn and that they be allowed.

B. The Prima Facie Case of Obviousness under §103(a) Has Not Been Established for Claims 15 and 17-25

1. Combination Does Not Teach all Claim Limitations

Examiner has not demonstrated that the combination of references teaches or suggests all the claim limitations. (MPEP §2143). Claim 15 recites, as does Claim 1, among other limitations, "varying the output frequency of the first voltage-controlled oscillator until the output frequency of the second voltage-controlled oscillator falls out of lock." (Claim 15, underlining added). For the aforementioned reasons with regard to Claim 1, the proposed combination does not teach or suggest this limitation.

2. Proposed Combination Would Render Chang Unsatisfactory for Its Intended Purpose

If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). (MPEP §2143).

The intended purpose of Chang involves a method of increasing the injection locking range of a VCO. For example, Chang teaches "demonstrating a locking range more than double that of the isolated VCO injection-locking range over the same range of injected signal power." (Chang, page 1535, column 1, line 13), (Chang, page 1542, column 1, line 6). Further, Chang teaches creating "an oscillator with a potentially large locking range and exceptional phase-noise

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characteristics." (Chang, page 1536, column 1, line 20). Applicant's invention, on the other hand, teaches "a method of reducing an injection lock frequency range of a second voltage-controlled oscillator in an integrated circuit having first and second voltage-controlled oscillators." (Claim 15, underlining added). Thus, decreasing or reducing the injection lock range would render Chang's invention unsatisfactory for its intended purpose, e.g., of doubling the locking range of the VCO.

Since the proposed combination of the alleged applicant admitted prior art and Chang does not teach or suggest all the claim limitations, and because there is no motivation to combine references when the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, the Examiner failed to establish a *prima facie* case of obviousness for Claims 15. Therefore, Claim 15 would not have been obvious at the time of the invention in view of the alleged applicant admitted prior art and Chang. Therefore, Applicant respectfully requests that the rejection of Claim 15 be withdrawn and the claim allowed.

Claims 17-25 depend, directly or indirectly, from Claim 15. As such, Claims 17-25 each incorporate all the terms and limitations of claim 15 in addition to other limitations, which together further patentably distinguish them over the cited references. Therefore, Applicant requests that the rejection of Claims 17-25 be withdrawn and that they be allowed.

C. The Prima Facie Case of Obviousness under §103(a) Has Not Been Established for Claims 26-29

1. Combination Does Not Teach all Claim Limitations

Examiner has not demonstrated that the combination of references teaches or suggests all the claim limitations. (MPEP §2143). While the allegedly admitted prior art in the Background of the Invention section of the instant application discloses a need for reducing the undesirable effects of intermodulation that occur when operating a single-die transceiver, it does not disclose "determining a crosstalk power between the first and the second VCOs using the measured injection lock frequency range and the measured signal power of the second VCO; and adjusting a signal power ratio between the first VCO and the second VCO to reduce intermodulation." (Claim 26, underlining added). Further, Chang does not teach or suggest "determining a

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crosstalk power between the first and the second VCOs using the measured injection lock frequency range and the measured signal power of the second VCO; and adjusting a signal power ratio between the first VCO and the second VCO to reduce intermodulation." Chang teaches "a simple scheme for enhancing the locking/capture range and phase-noise performance of FET-based voltage-controller oscillators (VCO's)." (Chang, page 1535, column 1, line 1). Chang focuses on the improved performance of a single VCO, but makes no mention of crosstalk, intermodulation, or adjusting a power signal ratio. Furthermore, equations in Chang do not account for intermodulation, crosstalk, or adjusting a power signal ratio. Thus, neither Applicant's background section or Chang teaches all the limitations contained in Claim 26.

Even with the combination of Chang and the allegedly admitted prior art, where one skilled in the art were to replace one or both VCOs of the transceiver in the background section of the instant application with the VCO of Chang, this would still not teach "determining a crosstalk power between the first and the second VCOs using the measured injection lock frequency range and the measured signal power of the second VCO; and adjusting a signal power ratio between the first VCO and the second VCO to reduce intermodulation." (Claim 26, underlining added). In contrast, what would probably be produced would be a transceiver with two independently locking VCOs having the features described in Chang. These VCOs probably would have been calibrated independently rather than in combination. With independent calibration, this proposed combination would not take into account crosstalk or intermodulation. Thus, the proposed combination would not teach or suggest "determining a crosstalk power between the first and the second VCOs using the measured injection lock frequency range and the measured signal power of the second VCO; and adjusting a signal power ratio between the first VCO and the second VCO to reduce intermodulation."

Therefore, because the cited references either alone or in combination do not disclose "determining a crosstalk power between the first and the second VCOs using the measured injection lock frequency range and the measured signal power of the second VCO; and adjusting a signal power ratio between the first VCO and the second VCO to reduce intermodulation,"

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among other limitations cited in Claim 26, the proposed combination in no way teaches or suggests the limitations of Claim 26.

2. *No Motivation to Combine References*

It is improper to combine references where the references teach away from their combination. (MPEP §2145). Chang teaches that "we also neglect the background thermal noise introduced by the resistors in the ILPLL circuits, dc amplifier noise, oscillator AM noise and AM-to-PM noise conversion, and PM noise deterioration due to the nonzero steady-state phase difference between the oscillator output and injection source." (Chang, page 1541, column 2, line 26). Further, Chang teaches that "the cross-correlation noise term between the ILO noise and PD noise in the ILPLL is also very small and can be neglected." (Chang, page 1540, column 2, line 19). Applicant's invention as claimed in Claim 26 relates to "measuring a signal power of the second VCO; determining a crosstalk power between the first and the second VCOs using the measured injection lock frequency range and the measured signal power of the second VCO; and adjusting a signal power ratio between the first VCO and the second VCO to reduce intermodulation." (Claim 26, underlining added). Crosstalk and intermodulation are forms of noise mentioned in Applicant's background. Further, Applicant's background discloses reducing noise in the form of intermodulation and crosstalk. Chang, on the other hand, neglects noise. Thus, Chang teaches away from the proposed combination.

Since the proposed combination of the alleged applicant admitted prior art and Chang does not teach or suggest all the claim limitations, and because the combination is improper when Chang teaches away from the proposed combination, the Examiner failed to establish a *prima facie* case of obviousness for Claims 26. Therefore, Claim 26 would not have been obvious at the time of the invention in view of the alleged applicant admitted prior art and Chang. Therefore, Applicant respectfully requests that the rejection of Claim 26 be withdrawn and that the claim be allowed.

Claims 27-29 depend, directly or indirectly, from Claim 26. As such, Claims 27-29 each incorporate all the terms and limitations of claim 26 in addition to other limitations, which

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together further patentably distinguish them over the cited references. Therefore, Applicant requests that the rejection of Claims 27-29 be withdrawn and that they be allowed.

D. The Prima Facie Case of Obviousness under §103(a) Has Not Been Established for Claims 30-34

1. Combination Does Not Teach all Claim Limitations

Examiner has not demonstrated that the combination of references teaches or suggests all the claim limitations. (MPEP §2143). While the allegedly admitted prior art in the Background of the Invention section of the instant application discloses a need for reducing the undesirable effects of intermodulation that occur when operating a single-die transceiver, it does not disclose "a transmitter having a first phase-locked loop (PLL), the first PLL having a first voltage-controlled oscillator (VCO); a receiver having a second PLL, the second PLL having a second VCO; and a parasitic loop that couples signals between the transmitter and the receiver causing intermodulation, wherein, the first VCO is configured to have a different power level relative to that of the second VCO to reduce the intermodulation." (Claim 30, underlining added). More specifically, Applicant's background section does not discuss a parasitic loop nor that the first VCO is configured to have a different power level relative to that of the second VCO to reduce the intermodulation. For these reasons, Applicant's background does not teach or suggest all of the limitations of Claim 30.

Chang does not teach or suggest "a transmitter having a first phase-locked loop (PLL), the first PLL having a first voltage-controlled oscillator (VCO); a receiver having a second PLL, the second PLL having a second VCO; and a parasitic loop that couples signals between the transmitter and the receiver causing intermodulation, wherein, the first VCO is configured to have a different power level relative to that of the second VCO to reduce the intermodulation." Chang focuses on the improved performance of a single VCO, but fails to even mention a parasitic loop or intermodulation. For these reasons, Chang does not teach or suggest all the claim limitations of Claim 30.

Even with the combination of Chang and the allegedly admitted prior art, where one skilled in the art were to replace one or both VCOs of the transceiver in the background section

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of the instant application with the VCO of Chang, this would still not teach "a transmitter having a first phase-locked loop (PLL), the first PLL having a first voltage-controlled oscillator (VCO); a receiver having a second PLL, the second PLL having a second VCO; and a parasitic loop that couples signals between the transmitter and the receiver causing intermodulation, wherein, the first VCO is configured to have a different power level relative to that of the second VCO to reduce the intermodulation." (Claim 30, underlining added). In contrast, what would probably be produced would be a transceiver with two independently locking VCOs having the features described in Chang. These VCOs would have been calibrated independently rather than in combination. With independent calibration, this proposed combination would not take into account intermodulation. Thus, the proposed combination would not teach or suggest a parasitic loop that couples signals between the transmitter and the receiver causing intermodulation, wherein, the first VCO is configured to have a different power level relative to that of the second VCO to reduce the intermodulation.

Therefore, because the cited references either alone or in combination do not disclose "a transmitter having a first phase-locked loop (PLL), the first PLL having a first voltage-controlled oscillator (VCO); a receiver having a second PLL, the second PLL having a second VCO; and a parasitic loop that couples signals between the transmitter and the receiver causing intermodulation, wherein, the first VCO is configured to have a different power level relative to that of the second VCO to reduce the intermodulation," among other limitations cited in Claim 30, the proposed combination in no way teaches or suggests all the limitations of Claim 30.

2. No Motivation to Combine References

It is improper to combine references where the references teach away from their combination. (MPEP §2145). Chang teaches that "we also neglect the background thermal noise introduced by the resistors in the ILPLL circuits, dc amplifier noise, oscillator AM noise and AM-to-PM noise conversion, and PM noise deterioration due to the nonzero steady-state phase difference between the oscillator output and injection source." (Chang, page 1541, column 2, line 26). Further, Chang teaches that "the cross-correlation noise term between the ILO noise and PD noise in the ILPLL is also very small and can be neglected." (Chang, page 1540, column

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2, line 19). Applicant's invention as claimed in Claim 30 relates to "a transmitter having a first phase-locked loop (PLL), the first PLL having a first voltage-controlled oscillator (VCO); a receiver having a second PLL, the second PLL having a second VCO; and a parasitic loop that couples signals between the transmitter and the receiver causing intermodulation, wherein, the first VCO is configured to have a different power level relative to that of the second VCO to reduce the intermodulation." (Claim 30, underlining added). Intermodulation is a form of noise mentioned in Applicant's background. In fact, Applicant's background discusses reducing noise in the form of intermodulation and crosstalk. Chang, on the other hand, neglects noise. Thus, Chang teaches away from the proposed combination.

Since the proposed combination of the alleged applicant admitted prior art and Chang does not teach or suggest all the claim limitations, and because the proposed combination is improper when Chang teaches away from the proposed combination, the Examiner failed to establish a *prima facie* case of obviousness for Claim 30. Therefore, Claim 30 would not have been obvious at the time of the invention in view of the alleged applicant admitted prior art and Chang. Therefore, Applicant respectfully requests that the rejection of Claim 30 be withdrawn and that the claim be allowed.

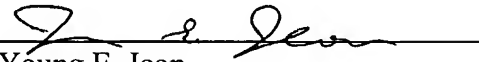
Claims 31-34 depend, directly or indirectly, from Claim 30. As such, Claims 31-34 each incorporate all the terms and limitations of claim 30 in addition to other limitations, which together further patentably distinguish them over the cited references. Therefore, Applicant requests that the rejection of Claims 31-34 be withdrawn and that they be allowed.

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III. Concluding Remarks

In view of the above, it is submitted that claims 1-7, 10-15 and 17-34 are patentably distinct over the cited references, and that all the rejections to the claims have been overcome. Accordingly, Applicant respectfully requests a timely indication of allowance. Should there be any further issues that can be addressed by telephone, Applicant cordially invites the Examiner to contact the undersigned at the number indicated below.

Respectfully submitted,
CHRISTIE, PARKER & HALE, LLP

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